Four Points Emphasized by Sam Miles in Promoting 1926 Shows

Asks for Trade Day attendance, the elimination of hotel exhibits, factory experts who can answer technical questions about their products and distribution of advance information to the press.

TO make the 1926 National Automobile Shows of maximum value to everybody concerned, Sam A. Miles, manager, and his corps of assistants in the Show Department of the National Automobile Chamber of Commerce, are engaged in a campaign which is directed at the trade and which has for its object the hammering home of these four vital points:

1. The necessity of making the Trade Days—Monday and Tuesday mornings—as widely representative of the trade itself as possible.
2. The necessity of discontinuing the practice of holding exhibits of parts and accessories in hotel rooms apart from the show itself.
3. The necessity of attendance at the show exhibits, especially on the Trade Days, of chief executives and sales or technical executives qualified to answer any and all questions about the product.
4. The necessity on the part of exhibitors of providing to the trade press advance information about their exhibits.

To make the Trade Days as widely representative of the trade as possible, Mr. Miles will send to at least 35,000 dealers about ten days before the New York show a letter urging their attendance on these days and enclosing special tickets.

Many Agencies Cooperating

In promoting the Trade Days Mr. Miles has obtained the cooperation of such organizations as the Motor and Accessory Manufacturers Association, the National Automobile Dealers Association, the Automotive Equipment Association and the Society of Automotive Engineers. Each of these organizations is urging its members to take advantage of the Trade Days. Commissioner William M. Webster, of the A. E. A., will spread similar word by mail and through the Association bulletin. C. A. Vane, general manager of the N. A. D. A., will send letters to 5,000 members urging attendance on the New York Trade Days, and later he will do the same with reference to the Chicago show. Coker F. Clarkson, secretary and general manager of the S. A. E., will send a smiliar letter to the engineers.

Neal G. Adair, manager of the Show Department of the M. & A. M. A., reports that exhibiting members have been urged to emphasize the Trade Days in their trade paper advertising and to write letters to their customers and prospects telling them about these days and the free credentials available for men in the industry. The M. & A. M. A. will also emphasize to all its members, exhibiting or non-exhibiting, the opportunity for business contacts on the Trade Days. A large attendance of executives will be urged. The Association also plans to send similar material to the manufacturing and wholesaling trade units.

In seeking the second objective—discontinuance of hotel exhibits—Mr. Miles will give wide publicity to the action of the N. A. C. C. directors in denouncing the practice as antagonistic and a menace to the shows. These attempts to transact at other places business for which, in part, the shows are promoted, distract the attention of factory representatives from the shows, where their business requires attendance.

Serious Effect of Hotel Exhibits

Unfortunately American shows are deprived by the limitations of exhibition buildings, of an advantage peculiar to the English shows, whose exhibitors are provided with office rooms near their exhibits, in which prospects and customers can be entertained. But the N. A. C. C. directors are convinced that if hotel exhibitions are continued they will have a serious effect on the display of parts and accessories at the shows, and that these outside exhibits are disloyal to the car manufacturer who expects his efforts in connection with the shows to be supported by display of the component parts of his car. Hence the directors urge that outside displays be stopped, and that all members of the Association refrain from visiting those which continue and use all proper means to discourage them. The directors point out that the proper place for the trade to do business during the shows is at the shows themselves on the Trade Days.

Point three covers the tendency marked in previous shows to deprive the product exhibited of the personal attendance of someone who is thoroughly versed in its technicalities. The necessity of filling this need is obvious. Mr. Miles will write personal appeals to all car exhibitors to have their best informed men on hand, especially on the Trade Days, and the M. & A. M. A. has already done so among the parts and accessories exhibitors.

To cover point four Mr. Miles has sent to the publicity representatives of exhibitors a letter urging them to send to the trade press in advance of the shows all information about their exhibits, even if some of this has to be confidential and for release only at the time of the shows. Pointing out that such confidence will not be violated, Mr. Miles notes that advance information suggests ideas of value to the trade press, the exhibitor and the show management. The exhibitors are also asked to send to the trade press without delay a list of their representatives at the shows and the dates of any meetings or dinners planned.

Mr. Miles has also sent a letter to all exhibitors urging them to mention in the New York and Chicago newspaper advertising the fact that they will exhibit at the shows.

Thermo-Couples—Their Use for Temperature Measurement and Control

Characteristics of rare metal and base metal type couples. Methods of keeping temperature of cold junction constant or compensating for changes in it. Special types for special uses. Installation.

By P. M. Heldt

THE combination of two dissimilar metals with a welded joint between them is known as a thermo-couple. Thermo-couples were originally developed as laboratory instruments, and the two "metals" then used were platinum and an alloy of platinum with 10 per cent of iridium. Both platinum and iridium are rare and expensive metals, which makes them unsuited for use in instruments for industrial purposes. Platinum is still being used to a certain extent for thermo-couples, but in the positive element it is now alloyed with 10 per cent of rhodium instead of with iridium, the former alloy having proven more immune to the adverse effect of high temperatures.

Fortunately, combinations of base metals have been found which give very satisfactory results in thermo-couples. One of these base metals is an alloy known as constantan, which consists of 46 per cent nickel and 53 per cent copper. Constantan can be used as the negative element together with nickel-chromium, iron or copper. These base metals, of course, are not as temperature-resistant or refractory as the rare metals, and whereas the platinum-platinum rhodium couple can be intermittently exposed to temperatures of nearly 3,000 deg. F., the limit of temperature for which a constantan couple should be used is set by various manufacturers at from 1,500 to 1,650 deg.

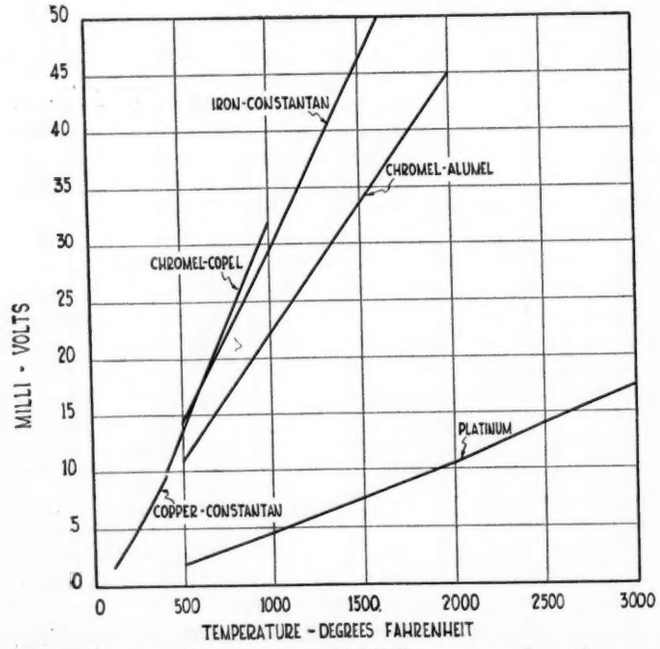


Fig. 1. Temperature—E. M. F. curves of various thermo-couples

Base metal theremo-couples have several definite advantages over rare metal couples. Owing to the low cost of the materials, the couples can be made of wire of substantial section, and are then much less delicate. The standard diameter for rare metal thermo-couple wire is 6 m. m. (0.0236 in.), and 5 and 4 m. m. wires are also made. On the other hand, base metal wire for thermo-couples comes chiefly in No. 8 and No. 10 B. & S. gage sizes, which have diameters of 0.128 and 0.102 in., respectively. Taking the 4 m. m. and the No. 8 B. & S. gage as the extreme sizes, the cross sectional area of the largest size wire used is nearly seventy times as great as that of the smallest. Moreover, most of the base metal combinations that are used in thermo-couples have thermo-electromotive force several times higher than that of the platinum-platinum rhodium couple, so that an equal degree of accuracy can be obtained with a less sensitive and therefore less delicate and less expensive galvanometer.

Rare Metals More Refractory

On the other hand, the rare metals are more refractory, and when used for the measurement of temperatures within the permissable range of the base metal couple, they are far from their temperature limit and therefore should be more nearly constant; that is, they should not loose their calibration as readily.

Several base metal alloys for the elements of thermo-couples are made by the Hoskins Mfg. Co., of Detroit. One of these, an alloy of chromium and nickel, is known as Chromel; another, an alloy of aluminum and nickel, as Alumel, and a third, an alloy of copper and nickel, as Copel. The first two, Chromel and Alumel, are usually employed together and are claimed to permit of their use at higher temperatures than any other base metal thermo-couples and to retain their accuracy for a longer period. Copel is used only for the measurement of comparatively low temperatures, not to exceed 1,000 deg. F. The temperature-e.m.f. relations of various thermo-couples used in the industry are shown in Fig. 1.

For the measurement of comparatively low temperatures, thermo-couples are often used without any protection. Of course, the wires must be insulated from each other, so that they cannot touch at any point other than the so-called hot junction, as that would amount to a short circuit. The wires, therefore, are always surrounded by tubes of insulating material, generally porcelain. In the case of rare metal thermo-couples these insulating tubes are continuous, that is, a single tube extends the full

Temperature Measurement and Control in Automotive Production

WITH the refinement in industrial processes—and particularly metallurgical processes—which has come during the past quarter century, there has arisen a great demand for apparatus for indicating, recording and controlling temperatures. Heat plays a part in many industrial operations, and to use it most effectively it must be controlled, either automatically by some temperature-sensitive device, or by hand in accordance with readings of temperature indicating or registering instruments.

When alloy steels came into use as materials of construction, it was found that, in order to take full advantage of their properties, they had to be heat-treated, and that the quenching and drawing temperatures had to be held within comparatively narrow limits. In large manufacturing operations the work of heat-treating had to be done by unskilled labor, and it was this that made the use of the pyrometer absolutely necessary. Today we have come to recognize that correct heat treatment is essential in the manufacture of steel parts that must be light in weight and still support severe loads, and it would be impossible to conceive of an automobile manufacturing plant without a heat treating installation and the concomitant temperature measuring equipment.

In the automotive industry, probably the greatest amount of temperature measuring equipment is used in connection with heat-treating installations. Nearly all steel parts entering the automobile are heat-treated at least once during the process of fabrication, and some receive a number of heat treatments. Cast iron parts used in the engine must be annealed; many wearing parts are case-hardened and other parts that are made of higher carbon and alloy steels are oil-hardened.

The heat treating department, however, is only one of several departments of an automobile manufacturing establishment that make use of temperature measuring and control equipment. Such equipment is used also in connection with core baking ovens in the foundry, paint drying ovens, enameling ovens, non-ferrous metal alloy melting furnaces, wood kilns and vulcanizing plants.

Temperature may be measured by its effects on the physical properties of materials. The effect which has been utilized most extensively in the past is that of heat expansion. Nearly all solids, liquids and gases expand when their temperature is increased, and the linear expansion is generally directly proportional to the rise in temperature. It is on this principal that the familiar mercury thermometer is based.

Another principal which can be made use of is that of vapor pressure. Every liquid has a tendency to pass into the gaseous state and in consequence develops a pressure which increases with the temperature—but not in direct proportion. The temperature at which the vapor pressure equals atmospheric pressure is known as the boiling point of the liquid. As the vapor pressure increases continuously with the temperature, this principal can be made use of for measuring temperature by measuring a pressure.

The electrical resistance of practically all conductors changes with the temperature. This change in resistance or resistivity follows definite laws and for pure metals it is nearly linear function of the temperature. Therefore, the temperature at any particular point can be determined by subjecting to that temperature a conductor of known resistance at a given standard temperature and known temperature coefficient and then measuring its resistance, which can be done with a high degree of accuracy.

There is one other electrical phenomenon that lends itself to the accurate determination of temperatures, and particularly of high temperatures, and that is the phenomenon of thermo-electricity. If an electric circuit is formed of two dissimilar metals whose junctions are welded together, and if one of the junctions is then subjected to a higher temperature than the other, an emf is set up in the circuit which will be directly proportional to the difference between the temperature of the two junctions. Therefore, if the cold junction is maintained at a standard temperature, say the normal atmospheric temperature of 60 deg., then the electromotive force in the circuit is a direct measure of the excess of temperature of the hot junction over 60 deg. The current can be measured by means of a milli-voltmeter and this voltmeter can be graduated in temperature degrees instead of in milli-volts.

This article will be followed soon by several others dealing with various phases of the problem of temperature measurement and control in automotive production.

length of the wire, while in the case of base metal couples, for mechanical reasons, they are made in short lengths which are threaded over the wires. These tubes are made with either a single bore, two or four bores, the latter being used in cases where two thermo-couples are combined in one for checking purposes.

At the high temperatures to which the elements of the thermo-couples are exposed they are quite sensitive to the corrosive influences of certain fumes and gases, and for this reason it is necessary to enclose them in gas-tight tubes. Where the thermo-couple extends into an oven it is necessary to further protect this tube against mechanical injury during the loading and unloading operations. The chief requirement in the case of the inner tube is that it be gas-tight, while mechanical rigidity sustained up to a high temperature is the essential feature of the outer tube. Both tubes, of course, must be able to withstand the highest temperatures for the measurement of which the thermo-couple is otherwise suited. Among the tubes used may be mentioned iron and steel (either plain or colorized), nickel-chromium, porcelain, quartz, graphite and fused silica (fire clay).

For certain purposes, such as measuring the temperature of molten metals, thermo-couples of special construction are used. It appears that the molten metal forms a coating on the elements and gradually decreases the sensitiveness of the junction to temperature changes. For this reason the junction must be constantly renewed, and

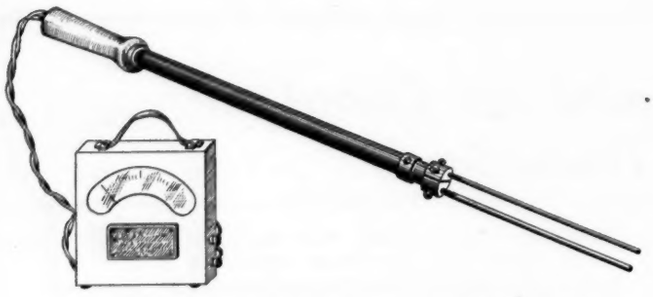


Fig. 2. Hoskins special thermo-couple for taking the temperature of molten non-ferrous metals

this is facilitated by providing small spools or reels of the element wires at the head end of the couple, so that after every two or three observations the wires can be pulled through the protecting tubes and a new junction formed.

Another form of thermo-couple for measuring the temperature of molten metals consists of a tubular element containing lead wires with clamps at the lower end into which removable thermo-couple "tips" can be inserted. These are in the form of bare wires, and the clamps, of course, are insulated from each other. It is unnecessary that the "tips" should touch each other, as the fused metal will furnish a conducting path from the one to the other. In fact, the fused metal will constitute a thermo-couple with each of the elements of the regular couple and the e. m. f. between the two elements for any given temperature difference will be the same as if the elements were joined together at their ends.

The equipment used for measuring the temperature of molten metal is portable and is of the simplest kind. It consists merely of the thermo-couple, which is in the form of a tube of about the length of a cane, with a handle at the top end, and of a milli-ammeter electrically connected to the thermo-couple. With one hand the operator holds the lower end of the thermo-couple down into the molten metal, while with the other hand he holds the ammeter in a position convenient for taking readings. It is a far cry from this simplest example of high temperature measuring equipment to the elaborate installations in modern metallurgical establishments. One of these portable equipments is shown in Fig. 2.

Another Form of Thermo-Couple

In one form of thermo-couple the iron protecting tube forms one of the elements of the couple, the other being formed by a wire (generally constantan) on the inside of the tube and welded to the closed end of the latter. To better protect the wrought iron or soft steel against the oxidizing effects of the high temperatures to which the couple must be exposed, these tubes are generally calorized on the outside. Calorizing is accomplished by fusing aluminum into the surface of the iron or steel by a process which forms a definite alloy of the aluminum with the iron or steel. This alloy penetrates well below the surface and therefore cannot be removed by any wear or abrasion. The surface of this alloy, upon exposure to heat, is converted to aluminum oxide (alumina), a material which has a fusing point above 4,000 deg. F. and is also highly resistant to oxidation.

However, for more effective protection under continuous exposure to high temperatures, outer tubes of nickel-chromium-iron alloy are largely used. Since this is a rather expensive alloy, the tubes are frequently provided with extensions of iron or steel.

Where the thermo-couple is to be used for measuring the temperature of a furnace it must extend through the furnace wall, and it is fastened in place by means of flanged collars which are secured to the tube of the thermo-couple by set screws. Where temperatures are to be measured inside an enclosed space that is either under super-atmospheric pressure or under vacuum, the head of the thermo-couple is threaded and flanged and the device is screwed into a threaded opening in the wall of the chamber.

Rare metal thermo-couples are protected by porcelain tubes, and with that protection can be used for laboratory or calibration purposes, but when it is desired to use them for industrial work it is necessary to provide them with outer protecting tubes of carborundum, graphite, fire clay, porcelain or metal. The graphite tubes are particularly adapted for use where the temperature of molten metal is to be ascertained, as graphite has a high heat conductivity.

A Rare Metal Type

One form of rare metal thermo-couple, made by Wilson-Maeulen Co., of New York, is illustrated in section in Fig. 4. One of the two wires, which are either 0.020 or 0.022 in. in diameter, is passed through a tube of refractory insulating material, while the other wire lies outside this tube and the two are welded together at the end of the tube. To distinguish the pure platinum wire this maker gold-plates the outer end of it for a short distance.

The head of the thermo-couple is of cast aluminum and forms a stuffing box. Into it is secured a refractory, non-porous protecting tube, a pressure-tight joint being obtained by means of asbestos packing and an aluminum gland. This protecting tube is closed at its inner end, and, being packed at the opposite end, completely protects the thermo-couple elements against furnace gases, etc. Fastened down to the head is a plate of molded insulation to which the binding posts or terminals are secured, and the same screws which fasten this plate also hold a cap or cover of molded insulation, protecting the binding posts and connections.

Outside the non-porous protection tube is an outer sheath which is cemented into the furnace wall. It is allowed to project a few inches from the wall on the outside and to extend into the furnace more or less in accordance with conditions in particular cases, usually between 1 and 6 inches. The less it extends into the furnace the less the chance of injuring it accidentally in loading and unloading.

In furnaces the thermo-couple may be installed either in the top or in the side wall. Inserting it through the top has the advantage that there is no danger of the tube sagging, even though it may extend into the furnace a considerable distance. Installation in the side wall has the advantages that less wiring is required and that it is easier to protect the cold end of the couple from heat.

For baths of molten metal use is sometimes made of angle type thermo-couples, one arm of which extends down into the bath, preferably half way down to the bottom, while the other arm is secured to the masonry support of the crucible.

In order that the pyrometer may accurately show the temperature to which the thermo-couple is exposed, the

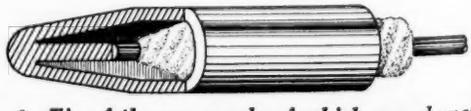


Fig. 3. Tip of thermo-couple of which one element is tubular and encloses the other, the two being welded together in closing the end of the tube

cold end of the wires of the couple must be maintained at a constant standard temperature, or else compensation must be made for the error introduced for any change in the temperature of the cold end. To make it easier to keep the cold end at a substantially constant temperature it must be placed at a considerable distance from the oven, and this necessitates the use of lead wires of the same material as the elements of the couple. With base metal elements this involves no particular difficulty, but in the case of rare metal thermo-couples such leads naturally are more expensive, and for that reason compensating leads are often used instead.

One method of maintaining the cold end at a constant temperature or nearly so is to provide a cold well, consisting of an iron pipe extending into the ground to a considerable depth. Leads of the same materials as the elements of the thermo-couple extend down into the well, and at the bottom of the well they are welded to two wires of the same metal, preferably copper, which connect to the milli-ammeter. This is illustrated in Fig. 5 on the left. At a depth of 10 ft. below the surface of the ground the temperature changes are very gradual, and the amplitude of the variations throughout the year do not exceed a few degrees. Care must be taken that no water can get into the tube, which means that it must be carefully closed up at the bottom by welding and at the top by sealing in the extension lead wires. One cold well may be made to serve for a number of thermo-couples. In sinking the cold well care should be used to avoid sewer pipes, heating pipes and boiler settings.

Connected at Bottom

Instead of connecting the copper wires to the extension leads from the thermo-couple at the bottom of the cold well, the extension leads may be connected together at the bottom of the cold well and the copper wires connected to one of the elements of the thermo-couple and its extension lead, as shown in Fig. 5 on the right.

Instead of a cold well a hot chamber may be used. This consists of a box with double walls, the space between which is filled with heat insulating material. Inside the box there is an electric heating element or lamp as well as a thermostat. The latter regulates the heating effect, and it is claimed that the temperature variations inside such a box can be kept within one degree Centigrade or about 2 deg. F. As the heat escapes through the walls and the source of heat also is located near the wall, the temperature is most nearly constant at the center of the box, and that is where the cold junctions are placed.

One maker of pyrometers uses a Thermos flask to obtain cold junction temperature control. The flask is half filled with water and the cold junction is in the upper part. Water has a high capacity for heat, and as heat can flow through the walls of the vacuum flask only at a slow rate, the temperature within the flask changes only very slowly, and during the period of the ordinary heating operation there are no appreciable variations if the water is poured

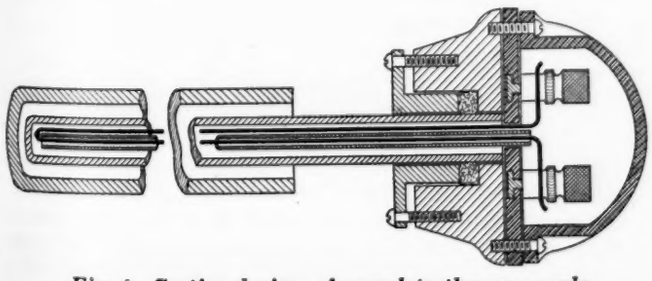


Fig. 4. Sectional view of complete thermo-couple

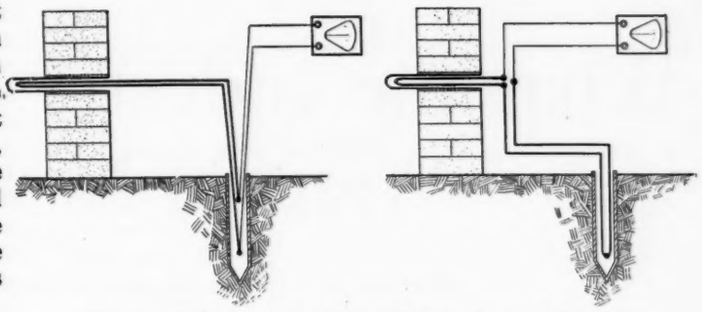


Fig. 5. Cold wells for the cold junctions of thermo-couples

in at normal temperature. The temperature, moreover, is known.

Instead of making provisions for keeping the cold junction at a constant temperature, some manufacturers of pyrometers provide means for automatic compensation for changes in this temperature. These are generally combined with the instruments for measuring the electromotive force of the thermo-couple and will be dealt with in a later article. If such compensation is provided the instrument and cold junction must be located close together.

The usual method of mounting thermo-couples in the walls of furnaces is as follows: A metal plate with a central boss on it is secured to the wall by bolts set in the wall in cement. Where a metal protecting tube is used for the thermo-couple it may be passed through the hole in the boss and through a corresponding hole in the wall, and secured in position by a setscrew in the boss. This method of mounting is suitable where there is neither an overpressure nor a vacuum at the point where the temperature is to be measured. Where pressure differences must be taken care of the head of the thermo-couple is usually threaded and screwed into a threaded hole in the mounting plate, and in some cases asbestos packing is used.

Radiation Pyrometers

Thermo-couples of rare metals must not be exposed to temperatures over 3,000 deg. F. In certain lines of work it is necessary to measure considerably higher temperatures, and radiation pyrometers are then made use of. The principle of these pyrometers is based on the Stefan-Boltzmann law that the radiation from a hot body is proportional to the fourth power of its absolute temperature. A radiation pyrometer comprises a parabolic mirror with the hot junction of a thermo-couple at its focus. Observations or measurements are made by exposing the mirror to the radiations of the source of heat, as through an open furnace door, and then measuring the voltage of the thermo-couple. Such radiation pyrometers are extensively used in steel plants for measuring the temperature of molten steel.

Airplane Maintenance Costs

ATTENTION of our readers is called to an error in make-up which occurred in the publication of the article, "Airplane Maintenance Costs—How to Estimate Labor and Materials," by Archibald Black, on pages 990-92 of the December 10 issue. In tables 1 and 2, which detailed the costs of overhauling airplanes and repairing wrecks, respectively, the various items were transposed so that the expense of labor and materials required for overhauls appeared under the heading of wreck repairs, and vice versa.

What the Industry Wants and Doesn't Want in New State Laws

Motor Vehicle Conference Committee outlines policy with regard to 1926 legislation. Compulsory liability insurance is opposed. Report is also made on taxation, regulation and restrictions.

By Leslie H. Allen

NINE State Legislatures meet in 1926. Probably in all nine of them bills will be introduced for the further regulation of the automobile industry. Therefore a summary of the attitude of the industry as a whole to automobile legislation in general is of much interest just at this time.

Such a summary is now available through the Motor Vehicle Conference Committee, which represents car owners, parts and accessory men, manufacturers, dealers and the rubber industry, through the American Automobile Association, the Motor and Accessory Manufacturers' Association, the National Automobile Chamber of Commerce, the National Automobile Dealers Association, and the Rubber Association of America, Inc.

This Committee has issued comprehensive pamphlets covering the four chief divisions of the subject of State automobile legislation: (1) Special taxation; (2) restrictions on sizes, weights and speeds; (3) regulation of motor vehicles as common carriers, and (4) compulsory automobile liability insurance, the latter being a subject of increasing interest in 1926 because of the Massachusetts compulsory insurance law.

The conclusions reached by the Committee after extensive study of these major topics are designed to guide automobile interests in the various States in formulating and advocating their viewpoints with reference to proposed State legislation next year.

The Committee opposes compulsory automobile liability insurance on these chief grounds:

1. That there are no facts which indicate that such insurance would reduce the number of accidents.
2. That there are no complete facts or statistics which show the amount of uncompensated losses due to motor vehicle accidents.

More Information Needed

The Committee admits that the accident situation has become a problem of extreme importance but it does not believe that available information is sufficient to establish definitely the fact that compulsory automobile liability insurance will remedy the situation.

The increasing number of highway accidents and uncompensated claims arising therefrom have inspired the introduction of compulsory insurance bills and most of the State legislatures meeting in 1926 are expected to consider such measures.

These bills are designed to reduce accidents and to provide monetary compensation for injuries to persons or damage to property caused by motor vehicle accidents. After investigating the subject for two years the Committee reports:

"In States where there is either State or municipal regulation of motor vehicles when used as common carriers it is the general thing to require owners to carry liability insurance in the form of indemnity bonds conditioned to meet claims arising from injuries or damages.

"To date, neither privately operated motor vehicles nor private carriers operated for hire have been subjected to this requirement under any State laws, nor, so far as the Committee knows, have there been enacted municipal ordinances along this line. Massachusetts enacted a law this year requiring all motor vehicle owners to carry liability insurance or liability bond to cover damages arising from death or personal injuries caused by accidents.

Losses Must Be Determined

"To arrive at a sound conclusion as to the wisdom and practicability of such compulsory liability insurance legislation, the extent of the need for such laws must first be determined. Reliable and comprehensive statistics showing the amount of uncompensated losses due to injuries or damages caused by the motor vehicle must first be obtained before any satisfactory conclusion can be drawn leading to remedial measures.

"This Committee has endeavored to obtain such statistics but, owing to the almost universal lack of any system for recording accidents in the various States, the results have been entirely unsatisfactory.

"Only three States have any figures showing the amount of uncompensated motor vehicle accident losses and these are largely based on estimates.

"Only ten States have laws requiring reports of all motor vehicle accidents to be made to some central authority; only five provide for compulsory local records; fourteen keep wholly inadequate records and twenty collect no accident data at all.

"Even in those States which have the most rigorous requirements the accident data is far from complete. Unless the State requires a report to a central office, it is quite clear that the number of motor vehicle accidents can never be determined, and no definite information indicating the amount of uncompensated losses arising from such accidents can be obtained.

"In the absence of such figures it would be unfair for the States to impose an extra burden on the motorists in the form of compulsory insurance to cover an amount of uncompensated damages which, when actually ascertained, might be comparatively small.

"It has been carefully estimated that the total cost of compulsory insurance to all the motorists in the United States would be more than $450,000,000. It is extremely

doubtful, in the absence of any statistics, that the total amount of uncompensated damages due to motor vehicle accidents would approach anywhere near this figure."

Pointing out that the grand total of motor vehicle taxes in 1925 is $631,551,820.73, or a gain of 12.1 per cent over 1924, and including a personal property tax of $100,000,000 as estimated by the N. A. C. C., the Committee, as the proper method of taxation to pay for highways, favors *adjustment of general and special automobile taxation on the basis of the use of automobile funds for such highway improvement as does not constitute an unfair burden on the individual motorist.*

It is held that this theory, now gaining ground, provides that after the amount of taxation is arrived at under the principle set forth in the preceding paragraph, such funds shall always be limited to improvement of highways of general automobile use and shall be devoted first to maintenance costs. Any surplus above such needs should be used to pay a substantial share of all other costs of highways of general automobile use or to defray all or part of the costs of bond issues to expedite construction of economically desirable highways.

Code of Principles

Upon the theory supported by the Committee the following code of principles to control special motor vehicle taxation has been worked out:

1. The State should be the sole taxation agency.

2. Motor vehicle taxation should be simple in form and distributed in equitable proportion among different types of motor vehicles.

3. No highway should be improved by expenditure of public funds in excess of its earning capacity and the return to the public in the form of economic transportation is the sole measure of the justification for the degree of improvement.

4. All money raised by such special taxes should be placed in the State motor vehicle highway fund and to secure best results should be expended under direction of the State highway department.

5. Cost of building and maintaining adequate systems of highways should be determined in an equitable relation to the benefits derived, and these may be summarized as follows:

a. Benefits to society in general, such as influence on education, recreation, health, fire prevention, police protection, national defense, postal service, living and distribution costs.

b. Benefits to groups, such as agriculture, manufacture, labor, railroads, mining, forestry and waterways.

c. Benefits to property served.

d. Benefits to the road user.

6. For the purpose of apportioning costs in relation to benefits received, all highways may be divided into two classes, those used by the general motoring public, and those which perform a purely local service function.

7. Special motor vehicle taxes to be levied and used only for the improvement and maintenance of highways used by the general public, *i. e.*, for general highway traffic flow lines.

8. Wide variance in valuations, tax burdens, number of motor vehicles in use and status of highway development in the several States prevent the adoption of any fixed formula as to the proportion of the total costs of highways in general use which should be paid for from motor vehicle funds. Generally speaking, these principles may be set forth:

a. In States where income from motor vehicles is insufficient to meet all the maintenance costs of highways of general motor use without undue burden to the individual motorist, such funds should be applied first to maintenance of inter-state and State highway systems.

b. In States where income from motor vehicles is sufficient to meet all maintenance costs of highways of general motor use without undue burden to the individual motorist, any surplus should be used for this class of highway reconstruction and administration costs.

c. In States where the number of motor vehicles will bring in large sums in excess of maintenance without placing undue burdens upon the individual motorist, such surplus should be used to defray all costs of maintenance and a substantial share of all other costs of highways in general motor use.

d. In States where motor vehicle income is more than sufficient to meet maintenance costs of highways in general motor use without undue burden to the individual motorist, it may be found advisable to use such surplus for the purpose of defraying all or part of the costs of bond issues to expedite construction of economically desirable motor highways.

9. Roads purely of local interest, serving only local needs, should be financed out of local revenues obtained from local general taxes. Special assessments on adjoining land to defray a portion of the costs of such roads may be justified.

10. Where extraordinary improvements are undertaken in the vicinity of or serving congested areas of population the increment, if any, in property valuation following the improvement should be drawn upon to defray an equitable portion of the cost.

11. Irrespective of the particular form of special tax of the motor vehicle, whether registration fees or motor fuel taxes, the aggregate amount of these taxes in any one year should not be so great as to impose an undue burden on the individual motorist.

Common Carrier Regulation

Fundamental principles for State regulation of motor vehicle common carriers are laid down by the Committee as follows:

1. Control over intra-state transportation to hire over regular routes should be exclusively in the hands of some State agency with no power whatever in the premises vested in the governing bodies of any political sub-division of the State.

2. Such State control should be placed in existing commissions such as the public utility commissions or other appropriate State regulatory bodies.

3. As a pre-requisite to the operation of the motor vehicle common carrier the owner thereof should be obliged:

a. To receive a certificate of public convenience and necessity, provided that lines in bona fide operation on the first calendar day of the legislative session at which the law is passed shall be presumed to be necessary to public convenience and necessity and such lines in the absence of evidence overcoming such presumption shall receive a certificate for routes established by them.

b. To take out liability insurance adequate to indemnify injuries to persons or damage to property resulting from negligent operation.

4. The State regulatory bodies having control over motor vehicle common carriers should be vested with the powers they exercise in controlling other forms of public utilities.

5. Taxes on motor vehicle common carriers should consist of:

a. Those imposed in the particular State upon motor

vehicles, the proceeds from such taxes being first applied to the maintenance and any surplus to all other costs of highways of general motor use.

b. Proper and equitable taxes in exchange for franchise rights, provided that if such taxes are adopted, an amount equivalent to those paid under (a) should be deducted.

6. Legislation should be enacted enabling steam railroads, trolleys, shipping companies and other public utilities to acquire, own and operate motor vehicles in conjunction with their regular lines of business.

In the subject of legal restrictions on motor vehicle sizes, weights and speeds the Committee finds these two questions involved:

1. Shall dimensions, weights and speeds of motor vehicles and their loads be reduced to the capacities of the weakest highways and parts thereof? Or,

2. Shall all highways and parts thereof be lifted up to standards of improvement adequate to carry the heaviest and swiftest loads that users of motor vehicles desire to place on them?

Between these two extremes the Committee believes that a compromise may be found which motor vehicle manufacturers in designing their product, highway engineers in building roads and bridges, and public authorities in maintaining and regulating traffic would do well to follow:

Translated into specific recommendations, this middle ground favored by the Committee calls for the following:

Size Restrictions

1. Width, including load, 96 inches. Traction engine 109 inches.

2. Height, including load, 12 feet 6 inches.

3. Length, including load: Single vehicle, 30 feet; combination of vehicles, 85 feet.

From the foregoing it is apparent that a highway of at least 20 feet in width is desirable.

Weight Restrictions

1. Single vehicular unit of four wheels or less, tractors and semi-trailers to be regarded as separate units, 28,000 pounds.

2. Any one axle or any additional axles of semi-trailers or trailers, 22,400 pounds.

3. Per inch width of tire, measured between flanges of rim in case of solid rubber tires

Size of Tire	Load Per Inch, Maximum	Size of Tire	Load Per Inch, Maximum
3 inches	400 pounds	7 inches	800 pounds
3½ inches	400 pounds	8 inches	800 pounds
4 inches	500 pounds	10 inches	800 pounds
5 inches	600 pounds	12 inches	800 pounds
6 inches	700 pounds	14 inches	800 pounds

4. Minimum thickness of rubber for solid rubber tires:

Size of Tire	Minimum Thickness
3, 3½, 4 and 5 inches	⅞ inch
6, 7 and 8 inches	1 inch
10, 12 and 14 inches	1⅛ inch

Speed Restrictions

No motor vehicle should be operated upon a public highway at a rate of speed greater than is reasonable and proper, having regard to the traffic and use of the highway, or so to endanger the life or limb of any person or the safely of any property, and should not in any event while upon an urban street run at a rate of speed greater than 15 miles per hour; upon a suburban street at a rate greater than 20 miles per hour; or upon any other street or highway at a speed greater than 30 miles per hour.

The Committee points out that State laws now prescribing for the three types of thoroughfares a graduated schedule of speed limits based on the kind of tire equipment of the vehicle and its gross weight are very difficult to enforce.

The Committee holds that the regulatory bodies should be empowered under definite limitations to grant written permits for the movement of restricted vehicles to meet emergency conditions, since it is imperative at times on certain highways that the movement of vehicles larger and heavier than those allowed by law be permitted.

A League of Nations Horsepower Formula

ABROAD there is a tendency, when some problem in the control of international automobile traffic arises, to refer it to the League of Nations. Just at present the subject of tax horse power rating of automobiles is being handled in this way.

In most countries the horse power formula in use for taxation purposes was adopted many years ago and is extremely conservative when compared with the actual output of modern high speed engines. The result is that in some of the countries where the use of a tax horse power formula dates back only a few years, or where a revision has been made in order to modernize the formula, an engine of given displacement has a rating as much as 150 per cent higher than in certain other countries.

If these formulae were used only for purposes of local or domestic taxation, the discrepancies between them would not matter. But when a tourist takes his car into a foreign country, he is generally compelled to pay a tax for the duration of his stay, which is based on the tax rating of his car in his native country, as his triptyque or automobile pass is made out there. This naturally works an injustice to natives of countries in which the tax rating is high.

To remedy this state of affairs the International Association of Automobile Manufacturers' Associations has been collaborating with a section of the League of Nations in the framing of a standard international tax horse power formula. French interests have proposed an empirical formula according to which four cylinder engines of less than 3 liters (183 cu. in.) displacement are to be rated at 5 hp. per liter, while engines of 3 liters displacement are to be rated at 14 hp. For other than four cylinder types coefficients are to be used with the formula, viz., 0.8 for six cylinder, 0.7 for eight cylinder and 1.30 for compressor type engines. The idea behind the plan of reducing the rating for large displacement and multi-cylinder engines is evidently that the "load factor" of such engines generally is comparatively low. That is, while their actual maximum power is high, the cars on which they are mounted use only a small fraction of this power in normal operation.

The formula, however, evidently is intended to be used to determine the horse power and not the tax, and if this is the case it is hard to see why a certain number of cubic inches displacement in a six cylinder, for instance, should be rated lower than the same displacement in a four cylinder.

Just Among Ourselves

Are More Car Price Changes Likely?

ABOUT a month ago, Nov. 26 to be exact, we went so far as to say that "Passenger car prices may be in for another drop within the next three months." Last week Dodge Bros., Inc., announced a cut of indeterminate size, the exact proportions of which are not to be known until January 7, just preceding the opening of the New York Show. The last price change by this company was a $10 cut on two phaeton models, a $60 cut on two coach models and a $50 cut on two sedan models on August 17, 1925. The announcement of this one cut, of course, does not necessarily mean that there will be a general lowering of lists. As a matter of fact, such a move during show week would be very likely to destroy much of the merchandising value of the big national exhibit, as it did in 1922.

Everyone's Going to Be There

IT begins to look as though the booths at the National Shows were going to be better manned this year than ever before. Always there has been the criticism that at many of the passenger car booths and at a number of the parts booths it was difficult to find factory representatives who could talk about products and policies from a factory standpoint. This year a number of companies are taking a definite stand on this question, particularly as regards the trade sessions on Monday and Tuesday mornings. A survey just completed by *Automotive Industries*, shows that many of the best known engineers in the industry will be in New York during show week and that a good proportion of them are planning to be in the booth at the show at least on the Trade Days. "Rest assured," writes one passenger car sales manager, "that we are going to do all in our power to welcome all visiting dealers at these exhibits." Chassis demonstrators are going to be on the job in one or two instances, while special efforts to provide accurate and sound information are being made all along the line.

Parts Booths to Be Well Manned

MANY companies are advertising the shows in general and urging attendance on Trade Days in particular by means of printed notices on their stationery. The larger motor car manufacturers are planning to bring anywhere from 17 to 25 factory men to New York for the show, while many of the smaller outfits will have 5 to 10 representatives on hand during the week. The parts makers all seem to be bringing thoroughly adequate staffs to the exhibits, so that the car engineers and dealers both will be able to talk to men in the parts booths who are familiar with all of the problems involved in the product and its use.

Make It Interesting! Eliminate Waste!

ELIMINATION of uninteresting advertising copy is one of the best possible means of reducing marketing costs. Advertising is useful only when it interests people and fundamentally its success stands or falls on that basis. If it doesn't interest the group for which it is intended, it's a failure regardless of the value of the information contained in it or the phraseology employed. To be successful, of course, it has to be something more than interesting, but without being interesting it can't be successful. It's a good deal of fun to run through magazine advertising sections checking the copy from just that one standpoint. Failure to interest often comes because the copy isn't adapted to the particular type of readers who subscribe to the periodical; sometimes because it is too general in character; sometimes because it is too detailed. And sometimes it is interesting! Think of the wasted dollars which would be going into constructive sales building effort if uninteresting advertising copy could be eliminated!

Can the Rubber Monopoly Be Stretched to Breaking?

ONE of the broader aspects of the rubber monopoly which has its talons in American industry at present is the possibility of formation of similar monopolies in other lines if means to break the present one are not found. The huge profits being reaped from the current hold-up, if allowed to continue, may put similar ideas into the heads of other money-grabbers with the result that the American public will find itself paying out huge sums for other products which are necessary in its daily life. That's the basic reason why some of the big men of the American government and of American industry are determined to break the strangle-hold on rubber possessed by a foreign monopoly. The job doesn't look like an easy one, but movements now under way seem to have possibilities of effectiveness if carried out actively.

Better Statistics and Efficient Marketing

IT'S too early to say definitely just what will come out of the national conference on distribution methods which met last week in Washington under the auspices of the Chamber of Commerce of the United States. One big idea that seems likely to be emphasized, however, is that more economic research and more accurate statistics are needed if American industry is to market its products efficiently.

N. G. S.

Rubberized Fabric Has Many Uses in Motor Vehicle Construction

Structural parts of rubber-impregnated cotton fabric are quiet in operation, require no lubrication and possess good cushioning qualities. Construction and uses.

RUBBERIZED fabric has been used for universal joints in propeller shafts and generator drives, for supporting the forward ends of torque arms, for spring shackles, for joining engines to frames, for body mountings, for shock absorber straps, for radiator support pads, and other automotive parts. This article contains a description of the construction of fabric parts, a summary of their applications and a review of their advantages.

RUBBER impregnated cotton fabric, used as a structural element of automotive vehicles, especially passenger cars, was considered very much in the light of a doubtful experiment not many years ago, except so far as tires were concerned. Today this class of material is being used in a number of mechanical parts and promises to see a still wider use in the near future.

Fabric disk universal joints in the propeller shaft, generator drive and other applications have given notable service as standard equipment on many cars and trucks. These disks possess three important advantages, namely, quiet operation, freedom from the need for lubrication at surfaces which are difficult of access and on which it is hard to maintain a lubricating film, and cushioning of the hammer-like blows transmitted through the parts.

In recent months some important concerns have adopted fabric supports for the forward end of the torque arm, while at least one car marker has used such supports for several years. Fabric spring shackles and fabric supports for joining engine to frame also have been adopted recently by several makers.

Used in Tension or Compression

Rubberized fabric may be used either in tension or compression, while in either case flexing may occur without injury to the fabric if the stresses imposed are not excessive or if they are localized in such a way as not to break or tear the fibres. Care must be used to clamp against metal in such a way that sharp edges do not cut and so that localization of forces will not tear the fabric.

The rubberized fabric is made both stretched and unstretched. The stretched fabric is used in places where it must function without distortion under continued tension operating normally without excessive and frequent peak loads. The unstretched fabric is used in places where tension loads (viz., forces exerted along the line of the threads) are applied only occasionally, the main and constant loads acting so as to place the threads of the material in compression. In this case the peak loads resulting from forces putting the threads in tension are more frequent but of shorter duration. The fabric therefore presents slightly greater cushioning qualities and returns to normal without permanent distortion.

The unstretched fabric parts are ordinarily made by coating plies or layers of cotton duck with a prepared rubber solution, pressing the layers together under a heavy load and curing or vulcanizing them while still in the slab or sheet. Parts to be made from this sheet are then punched out with dies, a press similar to those used in forming metal stampings being used.

Made in Form of Belting

The stretched material is ordinarily made in the form of belting. This method of manufacture permits the maintenance of a finished edge, cheaper costs and a more uniform product than would be the case if the slab or sheet method were used and the stretch eliminated from it during vulcanization. In making the belting the proper weight and weave of cotton duck is cut to the proper width and laid out on long tables. The rubber compound is then applied and the material is folded over on itself to the required number of folds, each fold making one ply of thickness. The material is then vulcanized under pressure while the entire length is maintained under tension which is sufficient to eliminate objectionable stretch but not sufficient to injure the threads of the fabric.

Stretched fabric is used by the Belflex Corporation in tension shackles and other constructions such as body mountings where the dead load is carried by the fabric in tension and unstretched fabric is used by them for such constructions as pivot shackles, motor mountings and torque arm mountings.

A patented process for making rubberized fabric articles, controlled by the Thermoid Rubber Company, consists of arranging the successive layers of fabric fanwise with the threads of one layer making an acute angle with those of the next layer as the two are cemented together. When the desired number of plies are built up the disk is punched out after which it is vulcanized in a mold insuring accurate location of bolt holes in the finished piece.

This method of construction, used in the Thermoid Hardy universal joint disk, is more expensive than the other methods of construction, due to the greater waste and increased labor involved, but the disk is claimed to have equal strength and stretch in all directions. In consequence distortion in normal service does not throw the disk off center as it may when all threads are parallel or at right angles to each other, due to the greater stretch at points in which the stress is applied in a line making an acute angle with the warp or filler threads.

In the case of universal joint disks, it is considered desirable to have the disk as flexible as possible consistent with adequate strength, partly to decrease thrust loads, hence a comparatively soft rubber is used. But the rubber band must be strong enough to avoid separation of plies. Thermoid's standards call for a rubber band which requires 18 to 20 lb. pull to give a separation rate of one inch per minute in a strip one inch wide.

This concern uses an 18 oz. builder fabric or duck made from long fibre cotton with filler threads having a strength equal to 90 per cent of the strength of the warp threads. The number of plies used varies from 6 to 20 per disk, but the most used thickness is 5/16 in., made from 9 plies of fabric.

A universal joint working on shaft angles of 9 deg. or less is usually made from 5/16 in. disks. For greater angles, more and thinner disks are used.

Clamping Washers Preferred

Clamping washers with concentric serrations are preferred. A maximum working stress of 800 to 1000 lb. per sq. in. in low gear is considered safe in passenger car practice. Hence for a 6 hole disk the allowable torque capacity is equal to the disk thickness, times the number of disks, times the clamping washer diameter, times 3000. For trucks, in which service is more severe and where work is done in low and reverse gear, about half this capacity is allowed.

Straps for use in the Watson Stabilator are made by the Thermoid Company from material similar to that used in their universal joint disks. The bearing surface of these straps has depressions or cups filled with graphite which acts as a lubricant. Torque arm pads, radiator support pads and engine support pads also are made by the Thermoid process.

In the use of rubberized fabric which is built up in the usual manner, viz., with the threads in one ply parallel to those in the next, deformation is avoided and greater strength obtained if the forces acting are controlled in such a way that they do not pull the material on the bias but act in the same line as the direction of the threads in the cotton duck.

This practice is followed by the Belflex Corporation, makers of fabric spring shackles and other products. Fabric used for the tension shackles is pre-stretched as described above (during the vulcanizing operation), to prevent or minimize stretch in service and thus retain the parts in correct relative position.

Shackles Not Pre-stretched

Compression or pivot shackles are not pre-stretched, partly because the dead load is in compression and partly because of the frequency of peak loads. Only the fabric is depended upon for strength, the rubber acting primarily as a binder and waterproofing agent. On Belflex compression shackles thin rubber pads are applied at points where the metal bears against the shackle, partly to exclude dirt and partly to reduce friction and prevent wear and localized stress with consequent cutting or chafing of the fabric.

In the tension shackle, which uses strips of five plies of duck, the working stress allowed is 320 lb. per ply per inch of width. The clamping members are serrated with 3/16 in. fillet radius on the serrations, but no special care is used to see that the serrations "ruate" with trough opposite crest.

Another Belflex product is the engine support, similar in construction to the compression shackle. It is designed to relieve the engine from stresses due to frame weaving and to minimize the transmission of engine vibration and noise to the frame and body of the vehicle. The Marmon Company is using this mounting as factory equipment on all their cars. The Belflex torque arm support, made also from fabric which is not pre-stretched, is now used by Packard, Cadillac, Peerless, Pierce-Arrow and Cunningham.

Long Staple cotton duck running 37⅛ oz. per sq. yd. is used in Belflex tension shackles. This fabric has 29 warp and 20 filler threads per inch. Eighteen to twenty per cent of the shackle proper (by volume) is rubber, or about fifty per cent by weight. Similar uses for rubberized fabric in other parts of the car doubtless will be found as the art develops. It has been suggested for use as supports for radiator and body and even for brake connections.

Perhaps the greatest advantage from the engineering standpoint derived from the use of the various rubberized fabric constructions is the extent to which they absorb vibrations and cushion shocks, but the owners of cars equipped with these devices will no doubt feel that their greatest merit is because they need no lubrication, adjustments for wear nor attention of any sort.

Automotive Course in Schools

A THREE-YEAR course designed to produce competent automobile mechanics will be started by the City of Cleveland shortly after the first of the year and thereafter will be a regular feature of the vocational training work of the Department of Education. This step is the result of the efforts of the Cleveland Automobile Manufacturers and Dealers Association to relieve the shortage of skilled workmen.

The course will be under the public school system, so will require no entrance fee. Classes will be recruited from Junior High School boys, 15 to 16 years old, on a basis of general intelligence and mechanical aptitude. The first year will be spent in school under competent instructors. Mornings will be spent in practical shop work and afternoons in study of mathematics, business English, physics, chemistry, blue print reading, shop sketching and related subjects. During the second year students' time will alternate between school and dealer service stations, two weeks being spent in each. The third year will be spent almost entirely in garages, one day every two weeks being given to classroom work.

The boys will be paid for all time spent in dealer service stations under a wage scale which has been accepted by the trade associations. In addition to assisting in procuring students and providing facilities in their shops for practical work the members of the association will supply engines, chassis, etc., to the school for studying and will also provide space in the annual Automobile Show to advertise the course.

The course will be under the direction of Howard L. Briggs, director of educational training in the city of Cleveland.

A NEW magnetic horn with a tone of considerable carrying power and which is simple and rugged in construction has been placed on the market by North East Electric Co., and is called the Northeaster. Tonal qualities are obtained by combining the fundamental diaphragm tone with a single octave overtone. The number of parts have been kept at a minimum and have sufficient durability to assure long life and freedom from attention. Contact points are tungsten and, with the anti-arcing condenser, are of standard ignition type. An outside screw makes tone adjustment easy. Finish of the horn is baked black enamel.

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

Cyprus Under British Rule

FIFTY per cent of the Island of Cyprus' 600 automobiles are a low-priced American make. In this connection the Automotive Division of the Department of Commerce is reminded through consular advices that "since Cyprus is now an integral part of the British Empire, the production of Canadian branch factories of American automotive manufacturers enjoys the usual treaty customs preferences." This island, which is Britain's newest crown colony, lies in the Eastern Mediterranean about 40 miles south of the Asia Minor coast and about 60 miles west of Syria. Cyprus has nearly 500 miles of good motor roads, about 400 miles of fair roads and 2,000 miles of poor dirt roads. Agriculture and mining have advanced profitably in the past few years and the colony is now enjoying comparative prosperity.

German Registration Increases 45%

GERMANY'S automotive figures for 1925, as promulgated by the Frankfurter Zeitung of October 28 and just forwarded to the Automotive Division of the Commerce Department, show a 45 per cent increase in number over the previous year. The total number of automotive vehicles increased from 293,032 in 1924 to 425,826 in the present year. The present number of passenger cars is 175,665; motorcycles number 161,508, and trucks amount to 80,363. The cities which have the highest per capita automotive ownership are Berlin, Hamburg and Bremen, followed by the Rhineland province and Saxony. Germany remains, however, far behind other European industrial countries in per capita ownership of automobiles.

Market Outlook Favorable in Japan

OCTOBER imports of automobile vehicles in Japan numbered 113, valued at yen 254,860, as compared with 145, valued at yen 331,345, imported during July, the Automotive Division of the Commerce Department is advised. The total value of August imports of automobile trucks, parts and accessories amounted to yen 891,269. The new 1926 model cars are commencing to arrive in Japan and dealers are optimistic concerning prospects for the coming season, recent price reductions on many makes of American cars being largely responsible for this change in attitude. The light truck market continues to improve and sales on one-ton trucks are reported better than at any time this year.

British Tire Exports Increase

OFFICIAL statistics of the Rubber Division of the Department of Commerce here show that the United Kingdom exported 650,731 automobile casings, including those mounted on chassis, during the first nine months of 1925, as compared with 550,263 during the entire year 1924. The 1924 monthly rate of export was 45,800 casings as compared with 72,300 casings for nine months of 1925, an increase of 57.8 per cent, which is more rapid than for any other important tire exporting country.

Chinese Interested in New U. S. Models

CHINA is showing considerable interest in the arrival of new American models, the Automotive Division of the Department of Commerce is informed through consular advices. Imports for September in China show a good increase as follows: United States, 57; Great Britain, 40; Canada, 9; France, 9; Germany, 2, and Japan, 8; motorcycle imports totaled 24, of which number the United States furnished 17. Automobile sales in North China, the dispatches continue, remain good. General Fang has completed the motor road from Pactao, the present terminus of the Pekin Suiyuan Railway, to Ninghtsia, a distance of approximately five hundred miles.

Poland Raises Duties Jan. 1

THE Automotive Division of the Department of Commerce learns through a cable dispatch from Poland that the new tariff amendment affecting import duties on a number of commodities into that country is to become effective January 1, 1926. The following shows the increase by various percentages of the import duties on various automotive products: passenger automobiles and bodies, 80 per cent; trucks, 23 to 25 per cent; motorcycles and side cars, 25 per cent.

Yugoslavia Customs Reduced

UNDER the terms of the most-favored-nation treaty between Austria and Yugoslavia, which became effective on September 15 last, Yugoslavia has granted reductions in import duty on a number of items among which are automobiles, accessories and trucks.

Sales Still High in Philippines

AUTOMOTIVE record breaking sales continued in October and early November for the Philippine Islands. The October imports of automotive products in the Philippines were as follows: Passenger cars 286, valued at 403,100 pesos; trucks, 39, valued at 62,000 pesos, and parts and accessories valued at 160,000 pesos.

Duty on Buses is Lowered

THE import duty on motor buses and passenger trucks into Salvador has been decreased from seven and one-half cents per gross kilo to three cents per gross kilo. The new tariff became effective October 24, according to advices received by the U. S. Department of Commerce.

Tariff Aimed at Trucks and Buses

IT is said in support of the attempt that is being made in England at present to have an import duty levied on foreign trucks and buses, similar to the McKenna duties on passenger cars, that the value of commercial vehicles imported from other countries since January, 1922, has been approximately $15,000,000. The Association of British Motor and Allied Manufacturing is endeavoring to secure the imposition of an import duty on commercial vehicles under the Safeguarding of Industries Act.

Plans for Deeper Study of Distribution Laid at Washington Conference

Present methods sound but susceptible to improvement. Such wastes as exist attributed to human failings.

"WASTES in marketing as they now exist are not inherent in the present machinery of distribution but arise through human failings such as lack of organized information and imperfection of performance which characterize alike producer, manufacturer and distributor.

"Present methods of distribution have been developed by economic forces and are economically sound."

Thus the National Distribution Conference which was brought to a close in Washington last week put its seal of approval on present distributing methods but indicated that considerable progress could and should be made in the future by adopting resolutions:

1. That a thorough study into present sources of statistics on distribution, classified by source, by commodity and by character should be made, and that the United States Chamber of Commerce should establish a permanent committee for the collection and publication of commercial statistics.

2. That Congress provide the necessary funds and authorize the Bureau of Census to conduct an enumeration of distributors as soon as practicable, and that the need for volume statistics as well as values be communicated to the Department of Commerce with the request that quantity statistics be gathered and, so far as possible, distribution expenses be segregated.

3. That the United States Chamber of Commerce provide a Joint Trade Relations Committee composed of representatives of manufacturers, wholesalers, retailers and consumers, to act as a clearing house for complaints of objectionable and destructive practices and to promote such coordination as will effect economies and improve mutual relations.

4. That individual distributors should educate consumers on the cost of services so that needlessly expensive services may be avoided or properly compensated.

5. That trade and commercial organizations and the trade press should further the adoption of uniform classifications of accounts in order to increase the efficiency of and facilitate cost comparisons.

6. That information concerning the processes of distribution should be presented to the public.

7. That the United States Chamber of Commerce provide a committee of distributors to cooperate in the efforts of the American Bar Association at the National Conference of Commissioners on United State Laws to advance uniformity and model State legislation affecting distribution.

8. That the United States Chamber of Commerce conduct a comprehensive study of instalment selling with particular regard for: (a) The effect upon the general credit structure as well as the cost and safest methods of financing instalment sales; (b) The approximate extent to which the instalment buying public is committed to future instalment payments in relation to its current income; (c) The probable effect upon the consuming public and business of further extension of instalment selling.

It was brought out at the Conference that marketing is as yet a practically unexplored region through lack of accurate market facts and analyses to determine effective methods of distributing commodities. Public as well as trade education is necessary in order to accomplish the removal of Federal and State laws which place obstacles in the way of economical distribution.

Although there is no one way in which all distribution problems can be solved nor, probably, one way in which any particular problem can be worked out, it was emphasized that accurate, timely information concerning markets and the changes in public and trade preferences is essential to the business man, individually and collectively, before he can accomplish his aim.

The Conference also pointed out the great lack of understanding about what is going on in distribution channels and emphasized the necessity on the part of manufacturers and distributors for closer observation of their individual distributing problems in the selection channels and ultimate outlets.

Talk by Hoover

Secretary Hoover, in a brief talk at the closing session of the Conference, expressed the belief that it was getting at one of the most difficult problems with which American business has to deal in emphasizing the need for more systematic and better organized information, not of statistical order alone but of a broader economic character. He hoped that some continuing action would result from the Conference to institute a definite organization for compiling and distributing statistical information concerning business.

The business of the Conference was grouped under six major divisions through reports submitted by committees on each of the following subjects:

1. Collection of business figures as a means toward economies in distribution.
2. Trade relations.
3. Market analysis — advertising and advertising mediums.
4. Expenses of doing business.
5. Methods of distribution.
6. General conditions affecting distribution.

AN illustration of the fact that pre-ignition and detonation are not identical, though are often associated, it is pointed out that when alcohol is used as fuel the spark can be so far advanced that a loop is formed at the left-hand end of the indicator diagram, without causing perceptible knocking.

Exports of Cars, Trucks, Tires and Parts

COUNTRIES	GASOLINE PASSENGER CARS										TRUCKS					
	Up to $500		$500 to $800		$800 to $1,200		$1,200 to $2,000		Over $2,000		Up to 1 ton		1 to 2½ Tons		Over 2½ Tons	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
Austria					3	$3,468	2	$3,116								
Azores and Madeira Islands	2	$705			1	995										
Belgium	1	250	63	$47,722	138	147,341	21	30,607	13	$37,655						
Bulgaria					2	2,209										
Czecho Slovakia	1	275	6	3,962	15	16,519	5	7,923	2	5,000						
Denmark			61	44,974	45	49,265	18	27,562					6	$8,716	2	$3,965
Esthonia																
Finland			16	12,804	14	14,576	4	5,794			1	1,180	2	3,250		
France			18	15,462	104	111,626	33	45,669	12	29,752	1	650				
Germany	12	6,098	154	124,898	234	245,799	73	117,346	13	35,334	171	97,636	16	15,954		
Gibraltar					1	875										
Greece	23	10,930	5	3,849					1	2,500	4	4,164	7	12,130		
Hungary			4	2,730	7	7,703	7	11,247								
Iceland and Faroe Islands																
Italy	687	197,172	9	7,179					1	2,500	75	17,700	201	47,436		
Latvia	1	175	1	691			2	2,956	1	2,190	2	876				
Malta, Gozo and Cyprus Is.					1	971	1	1,509								
Netherlands			11	8,275	51	57,985	17	25,342	11	31,912			13	22,829		
Norway			15	10,900	8	8,671	2	2,720	3	7,975			1	1,492	2	4,240
Poland and Danzig													3	5,874		
Portugal			3	2,269	10	11,131	3	4,925			1	820	2	2,290		
Rumania			8	6,232	5	5,811	2	3,146	3	8,667						
Russia	27	9,720	6	4,624					5	16,523						
Spain	182	76,682	219	180,365	146	157,142	42	68,139	16	50,266	190	84,440	20	22,421		
Sweden			74	55,960	110	111,216	26	40,991	2	5,000			4	3,732		
Switzerland			2	1,731	18	17,183	12	18,874	2	4,547						
Turkey					3	2,964	7	10,977								
United Kingdom	20	10,852	354	246,678	76	77,677	27	49,735	6	16,735	11	9,774	64	66,638	2	9,494
Irish Free State			14	11,026												
Yugoslavia	3	1,387	5	4,135	2	2,107	1	1,727	1	3,259						
United States																
British Honduras	1	250	2	1,614												
Canada	256	64,844	300	188,318	366	362,794	111	167,735	54	163,630	25	17,036	89	101,984	14	65,135
Costa Rica	2	640	4	2,973	9	9,836					2	1,691	2	1,995		
Guatemala	4	1,146	1	758	21	22,566	8	11,596	1	2,245	3	1,310	13	20,192		
Honduras	9	3,211			3	2,972	1	1,389			4	2,056				
Nicaragua	1	380			6	6,171	1	1,366					1	1,167		
Panama	7	3,007	50	39,363	11	11,773	1	1,867	1	4,245	15	9,075	5	5,279		
Salvador	2	720	18	13,597	25	25,902	7	11,387	2	5,300	3	1,152	3	3,541	7	15,723
Mexico	820	254,628	165	117,423	314	315,708	73	107,417	52	149,081	337	119,388	29	34,686	16	80,620
Newfoundland	2	992			1	1,151										
Barbados			1	608	3	3,245	1	1,424								
Jamaica	29	10,748	28	19,643	9	9,122					30	10,500	1	1,470		
Trinidad and Tobago	20	8,000	1	685	1	1,014										
Other British West Indies	25	8,712	8	5,153	5	4,651	3	3,909			4	2,344	2	2,183		
Cuba	121	114,339	60	44,919	90	84,904	19	29,174	19	52,633	113	36,627	14	18,244	9	28,029
Dominican Republic	205	125,749	8	6,336	15	16,119	1	1,332	2	5,051	14	11,747	1	880	3	9,493
Dutch West Indies	4	1,388	16	7,808	3	3,364	1	1,385			1	435				
French West Indies																
Haiti	7	2,575	2	1,532	7	7,579	1	1,332			5	3,279	4	4,147		
Virgin Islands	5	1,928									1	480				
Argentina	342	149,893	620	484,219	516	532,543	70	106,541	37	111,673	96	22,076	20	33,899	2	6,930
Bolivia							1	1,509					2	3,618		
Brazil	313	106,091	122	87,169	200	203,689	55	74,615	9	23,413	2	3,450	3	3,211	1	3,200
Chile	25	10,687	32	24,973	15	16,589	9	13,717	8	22,142	46	19,675	29	39,437	23	59,470
Colombia	68	26,131	26	20,657	20	20,795	17	25,519	2	5,400	21	7,977	22	23,401	4	20,332
Ecuador	7	2,536	3	2,533	3	3,179					15	7,020	1	1,494		
British Guiana			1	706	4	4,238										
French Guiana																
Dutch Guiana	1	350														
Paraguay	4	1,336														
Peru	43	16,250	13	9,058	17	17,605	1	1,332	4	10,000	55	21,302	22	30,256	7	29,799
Uruguay	170	52,451	40	30,035	95	100,043	28	42,735	11	27,185	53	15,969	9	12,938	2	7,360
Venezuela	141	52,611	29	21,518	60	61,617	19	26,932	12	32,937	82	30,646	20	30,355	3	6,308
Aden	4	2,135														
British India	10	5,477	138	109,621	139	135,346	13	19,119			42	34,675	20	23,929		
Ceylon	2	960	9	6,669	19	18,400	1	1,487					9	12,199	2	2,496
Straits Settlements	30	10,975	99	75,819	59	60,270	4	6,530	2	5,000	2	1,006	5	9,450	3	7,995
China	25	8,919	60	45,640	68	67,947	10	17,414	2	7,159	48	47,971	82	84,918		
Chosen																
Java and Madura	2	1,124	38	27,136	33	32,528			4	10,458					2	4,216
Other Dutch East Indies			15	9,541	1	1,241	1	2,213					6	5,971		
French Indo China																
Hejaz, Arabia and Iraq	122	40,781									2	328				
Hongkong					1	980										
Japan	9	2,993	58	54,200	67	63,424	2	2,557	5	13,494	1	500	1	1,115	5	16,493
Kwangtung	22	7,890	15	11,553			3	4,368								
Palestine and Syria	4	1,447	32	24,069	7	6,813	2	3,018	1	2,959	5	3,549				
Persia			1	797												
Philippine Islands	165	68,190	61	49,318	18	18,681	7	10,453	5	13,837	54	21,653	10	9,963	2	2,347
Siam			5	4,080												
Turkey	4	1,440														
Australia	1,354	508,571	1,916	1,325,036	920	1,029,082	89	129,928	37	96,368	1,125	562,620	161	206,681	14	54,702
New Zealand	128	62,242	123	94,152	361	403,396	50	78,412	8	18,881	115	56,957	69	86,067	2	8,500
British Oceania	2	992	5	3,992	1	990							1	1,977		
French Oceania																
Other Oceania																
Belgian Congo			1	758												
British West Africa					4	4,700										
British South Africa	103	47,083	346	266,410	898	910,759	43	60,140	2	5,428	17	18,330	14	14,301		
British East Africa	1	300	4	3,164	55	63,210	1	1,509			27	22,200	39	54,268		
Canary Islands	3	2,268			3	3,409					36	23,020	4	5,207		
Egypt	103	39,360	27	18,677	25	25,622	1	1,332					6	8,928		
Algeria and Tunis											3	1,212				
Other French Africa	6	2,473	1	692	1	1,097					1	415	2	1,986		
Liberia	1	380											4	1,956		
Morocco	75	27,721									1	539				
Portuguese East Africa	14	4,787	10	7,735	5	5,905					2	1,112	10	7,425		
Other Portuguese Africa													8	6,537		
Spanish Africa	3	1,249									2	820				
TOTAL	6,085	$2,185,896	5,572	$4,067,033	5,498	$5,756,203	960	$1,452,998	372	$1,048,334	2,866	$1,359,382	1,082	$1,130,020	127	$446,847

for October, 1925 | Canadian Exports

ELECTRIC VEHICLES		PARTS	TIRES						PASSENGER CARS						TRUCKS		PARTS	COUNTRIES
			Casings		Inners		Solids		Up to $500		$500 to $1,000		Over $1,000					
No	Value	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	Value	
		$443	264	$4,890	90	$286	62	$2,675										Austria
		990	2	17														Azores and Madeira Islands
		188,522	2,281	54,030	1,641	6,884	3	327			8	7,048	14	20,566			80,285	Belgium
		203													4	1,832		Bulgaria
		201	611	12,921	680	1,894	134	4,530										Czecho Slovakia
		184,373	2,863	46,672	2,483	5,658	125	3,504			4	3,585	6	9,324			13,999	Denmark
		17																Esthonia
		5,432	215	5,554	146	638												Finland
		529,556	2,936	55,213	4,550	16,366							1	1,056				France
		71,651	734	15,575	318	1,136					20	12,651	75	101,323			5	Germany
		788																Gibraltar
		10,350	1,540	25,764	2,058	4,613	131	3,408										Greece
		305	49	963	59	226												Hungary
		832	264	4,270	309	592												Iceland and Faroe Islands
		100,613	265	4,390	343	812												Italy
		1,190	208	4,552	150	406												Latvia
		1,146							4	1,703					3	1,304	7	Malta, Gozo and Cyprus Is.
		73,341	1,459	37,128	1,640	7,106	22	926									531	Netherlands
		20,671	896	16,983	709	2,238	86	5,253									181	Norway
		590	100	2,673	102	457												Poland and Danzig
		7,755	400	8,237	646	2,169												Portugal
		13,292	258	6,148	393	1,517			1	432	3	1,815	2	2,636	30	12,505		Rumania
		8,327	25	469	44	89												Russia
		59,384	1,644	31,653	1,643	4,342	62	3,493					6	8,499			3,190	Spain
		58,498	2,644	53,621	1,964	4,833	22	2,410			6	4,212	4	4,388			34	Sweden
		4,102	295	14,902	513	3,773	2	195									6	Switzerland
		7,292	58	1,051	130	435			6	2,142	2	1,209	10	13,640	2	834		Turkey
		290,738	15,601	219,961	9,158	21,164	2,303	66,403			688	628,973	244	311,669	1	1,000	23,436	United Kingdom
		19,442	150	1,582	250	472											3,873	Irish Free State
		1,558	260	4,405	484	1,186	74	2,365			2	1,797	3	3,732				Jugoslavia, Etc.
									12	2,960	2	1,500	2	3,485	2	850	47,918	United States
		62	31	319	39	84												British Honduras
2	2,871	2,771,395	985	21,803	1,638	5,513	84	3,331										Canada
		3,910	189	5,357	99	523			2	844	2	1,768	2	2,450	12	5,002	5	Costa Rica
		8,767	189	6,336	315	1,329							4	4,882				Guatemala
		2,501	166	3,538	210	567	20	1,321					1	1,228				Honduras
		100	140	2,486	199	616	2	120										Nicaragua
		6,404	667	13,100	1,158	5,279	20	754			1	899	8	9,834				Panama
		3,893	72	1,691	208	706									2	834		Salvador
11	5,390	105,973	3,073	55,267	4,556	10,800	285	6,708			3	2,313	22	28,187			162	Mexico
		651	42	650	33	61	6	201	2	400							378	Newfoundland
		1,720	34	390	2	5	2	40	7	2,286	4	3,368					63	Barbados
		15,383	63	996	44	91	38	2,033	13	5,385					2	834	32	Jamaica
		4,782	12	117			2	86	34	11,960	5	3,405	3	3,562	2	840	111	Trinidad and Tobago
		4,198	79	1,411	179	469			1	449	2	1,778					1,532	Other British West Indies
2	5,000	86,548	8,543	102,998	7,402	16,043	890	31,465			4	3,441	14	16,770			24	Cuba
		36,764	1,295	12,069	368	763	46	2,138			2	1,759	6	7,329				Dominican Republic
		2,035	247	3,848	447	1,119	3	63	4	1,463					2	864		Dutch West Indies
		1,236	25	389	5	16	2	236										French West Indies
		9,035	460	9,300	713	2,372			3	1,251	1	981	3	3,659	7	2,934		Haiti
		1,229	26	267	8	9												Virgin Islands
		713,853	13,926	183,824	25,134	55,867	610	18,576	140	53,542	60	55,457	42	53,712			154,680	Argentina
		940	6	252											24	10,004		Bolivia
		277,786	7,899	96,379	7,054	9,105	327	12,118	39	14,526	4	3,589	16	21,060			52,680	Brazil
		61,169	724	17,421	416	1,664	21	1,139	6	2,604			12	15,677				Chile
		50,596	922	20,684	1,540	5,885	21	1,320	35	14,996	7	4,569	4	4,977	27	11,269		Colombia
		3,996	312	6,855	356	954					2	1,426			10	4,168		Ecuador
		2,151	12	181	6	16	2	37	20	6,968					4	1,288	54	British Guiana
		36	6	79	6	13												French Guiana
		188	27	364	148	273												Dutch Guiana
		128							6	2,641					4	1,667		Paraguay
		42,329	1,183	17,763	598	1,595	18	786			3	2,683	4	5,077	8	3,500	38	Peru
		44,947	2,646	34,038	1,270	2,665	33	1,469	157	64,998			9	12,338			2	Uruguay
		30,150	1,553	29,567	2,487	6,800	53	1,515	32	13,368	1	884	6	7,328	26	10,838		Venezuela
		1,222	222	2,691	207	396			10	2,820							115	Aden
		61,385	6,003	51,093	2,320	7,529	234	7,459	647	230,010	41	32,215	7	9,459	215	74,601	37,734	British India
		7,878	227	5,941	117	505	65	1,508	96	32,385	2	1,776			26	8,026	2,948	Ceylon
		38,950	757	9,426	836	3,301	76	2,416	680	220,900	7	6,483			35	12,122	20,276	Straits Settlements
		25,753	2,061	22,800	4,936	5,889	179	2,937	12	5,103	19	10,397	6	8,074	12	5,043	72	China
		423	25	224	100	133												Chosen
		16,627	1,964	28,259	1,321	3,103	489	16,438	776	249,080			3	3,948	149	50,674	19,346	Java and Madura
		4,187	84	1,462	66	173												Other Dutch East Indies
		335	10	224	12	46												French Indo China
		1,958	424	13,215	1,082	3,774									4	1,682		Hejaz, Arabia and Iraq
		1,651																Hongkong
		189,511	10,659	120,138	15,665	26,650	1,156	18,764	23	8,720	12	8,984	6	8,644				Japan
		429																Kwangtung
		8,828	734	14,669	575	1,726			6	2,559	1	605	2	2,524	3	1,153		Palestine and Syria
			26	585														Persia
		58,624	6,631	85,449	5,358	9,802	627	16,649										Philippine Islands
		726							17	5,696					39	11,679	4,888	Siam
		963																Turkey
3	10,583	412,132	10,656	175,390	6,064	17,018	1,775	58,920	1,069	303,306			7	10,098	644	227,383	99,279	Australia
		125,065	4,528	78,636	1,393	4,707	866	34,377	209	71,815	191	151,281	79	94,683	168	65,148	61,719	New Zealand
		588	11	178	9	19			2	756	1	899						British Oceania
		1,425	72	1,127	99	249	8	398										French Oceania
		2,725	60	1,123	109	305			2	888							7	Other Oceania
		3,626																Belgian Congo
		5,101							37	11,944					22	5,506	5,099	British West Africa
		88,372	1,951	22,345	1,294	3,113	24	779	271	106,043	17	11,214	1	1,235	136	46,653	21,669	British South Africa
		13,105	46	1,126					43	16,076			1	1,231	95	37,089	5,187	British East Africa
		6,283	73	1,299	88	174	5	294							10	3,228		Canary Islands
		9,972	114	3,152	144	329	154	6,402	21	8,919	3	2,401	1	1,222	12	5,044	445	Egypt
																		Algeria and Tunis
		1,743															332	Other French Africa
		174	73	3,643	157	1,254												Liberia
		1,838																Morocco
		1,265			75	190			18	7,847					5	1,626	7	Portuguese East Africa
		1,844	18	460	28	94												Other Portuguese Africa
		253	363	4,491	213	474												Spanish Africa
18	$23,844	$7,051,418	129,368	$1,932,509	129,409	$311,447	11,166	$348,286	4,463	$1,490,285	1,130	$977,365	636	$819,506	1,747	$629,024	$662,349	Total

85% of Australian Trade

CAN WE HOLD IT?

A student of this important market makes some suggestions which should be of value to American automotive manufacturers.

By J. Ross Duggan

If You're Going to Trade in Australia—

HERE are some things the author of this article has discovered about selling American automotive products in Australia. The points he makes are important and every executive interested in the cultivation of the Australian market should study them:

Too much care cannot be taken in the selection of the proper type of factory representatives.

The closest possible cooperation should be extended by the factory to its distributors in the matter of training retail salesmen.

Any tendency to make sudden or frequent changes of distributors is dangerous. This practice has been carried to extremes, apparently, by some American manufacturers and has tended to weaken their positions in the Australian field.

Don't overlook the importance of the European light car. This type is popular in the cities and it is in the cities that the greatest number of cars of all types are sold.

In the sales of parts and accessories, special steps should be taken to protect American patent rights.

Parts and accessory manufacturers to be successful must either deal with the legitimate jobbing trade or do their own jobbing and sell to the retailers.

Mr. Duggan is the Canadian and export manager of the Westinghouse Union Battery Co., of Pittsburgh, Pa. The trip on which this article is based was his fifth to Australia in the last 15 years and consequently he is well posted on automotive trade conditions there.

THERE is no element in the character of the people or in the nature of their government which can prevent Australia from being a prosperous and wealthy country. Business conditions are good and improving all the time. The automotive trade is making steady and increasing progress as may be judged from the following figures:

Car Population of Australia

January 1st, 1924	140,000 cars
January 1st, 1925	185,000 cars
June 1st, 1925	227,325 cars

In addition, on January 1, 1925, there were 20,000 trucks in Australia.

The importance of the Australian market to American automotive manufacturers may be best judged by the fact that during 1925, Australia and New Zealand have taken 20 per cent of the total automotive exports of the United States, including cars, trucks, parts, accessories and tires. A tribute must be paid to the suitability of American cars to Australian conditions, to the excellent export shipping methods adopted by American manufacturers and to the correctness of all export documents which are of a very complicated nature so far as Australia is concerned. This means a word of praise not merely for the export and shipping departments of the various factories, but also for the New York commission and forwarding houses through whose hands pass a great many orders for export to Australia and New Zealand.

A ward of warning, however, should be issued to American automobile manufacturers that they are not holding their own in the Australian market. They are meeting with stiff competition and the percentage of importations from other sources is increasing at a remarkably high rate, as the following figures will show:

Imports of Cars Into Australia

	Jan.-June, 1925	Jan.-June, 1924	Increase or Decrease
United Kingdom	4,019	1,675	+139%
United States	26,688	24,000	+ 11%
Canada	9,153	10,972	— 16%
Europe	2,465	2,114	+ 16%
	42,325	38,761	

The low rate of increase of imports of U. S. cars as compared with the United Kingdom and Europe is to be noted, as well as the important fact that exports from the Canadian factories of American companies have actually decreased. It is true that the Ford Motor Co. commenced assembling in Australia during 1925 but this would effect only figures from Canada.

Comes to America

There are two reasons for this remarkable increase of European cars. In the first place, the European car manufacturers are recovering from the effects of the World War, and have also learned some lessons from American production methods; but *principally, they are making a point of training their sales representatives for export service very carefully.* They exercise much discretion in the proper selection of the right personality for export salesmen. These men are not selected in any haphazard way and sent out to foreign territories equipped with half-baked knowledge. When they do arrive, they settle down in the export territory for a number of years and play their part in the civic and economic development of their adopted country.

Light Car Popular

In the second place, *the European light car seems to have caught the fancy of a great number of Australian buyers.* Morris-Cowley, Citroen, Austin, Swift, Rover and Fiat cars are well distributed in Australia and New Zealand and their sales are increasing rapidly. In fact, the Morris-Cowley is experiencing quite a boom at the present time, and the dealership of this car in every part of Australia and New Zealand is eagerly sought after.

However, it does not seem that the European light cars will immediately become popular for the country districts of Australia on account of their reduced tread; but in cities they seem to be gaining in favor.

The seriousness of this situation may be judged by the fact that 60 per cent of the population of Australia is to be found in cities of 25,000 people or over.

Some Australian distributors of American automobiles feel that they have a very insecure hold on their distributorship. This feeling engenders suspicion of the factory policy. The result is that negotiations are slowed up, and oftentimes less than the necessary financial investment is put into the distribution of an automobile for fear that the American manufacturer may be tempted to transfer his distributorship by reason of a better bid.

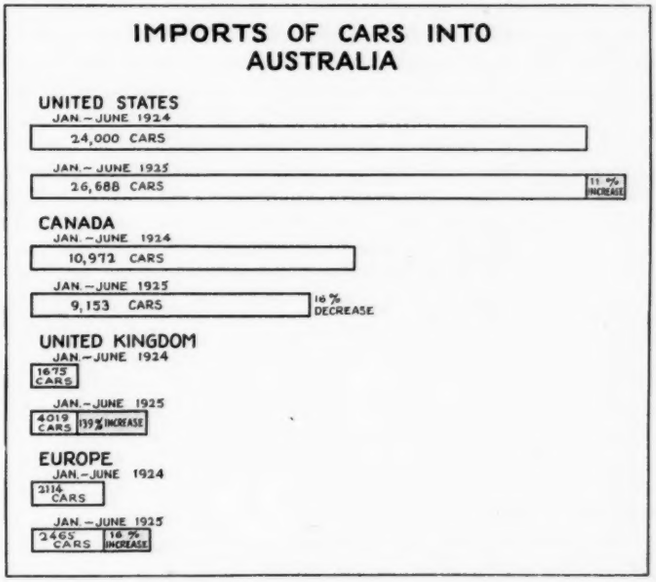
During the past 12 months, the automobile fraternity in Australia have been much agitated by the action of an important automobile manufacturer, who without apparent cause or warning transferred his distributorship in one of the most important centers of Australia, leaving the rejected distributor with good show-rooms, an efficient sales staff, heavy overhead, etc., all up in the air without anything to sell and being obliged to carry his overhead during the space of time that is necessary to consummate other arrangements, which takes a long time in the export market. There have also been several other instances of this type recently which cast a shadow upon the prestige of the American automotive industry in Australia and New Zealand.

Lack of Training Facilities

There exists in Australia and New Zealand an apparent lack of facilities for the training of salesmen of Australian distributors. There should be better cooperation between the factory representatives of American firms and their distributors so that the Australian salesman may be schooled in the correct method of presenting an automobile product to his prospect. The factory representative can convey the domestic factory policy which should be modified in its application by the selling experience of the distributor.

It is imperatively necessary that factory representatives be hand-picked for the Australian and New Zealand market. Automobile distribution in Australia requires a large amount of capital. Practically every automobile distributor in Australia has to put more money into his business than would be necessary to run an automobile agency on Broadway, New York. As usual in British countries, the big business men are hedged in by national and social customs that are entirely different from those that prevail in the United States. Open diplomacy in business is not practiced. There is no possibility of butting in on the real people in Australia. As an Australian business man expressed it:

"The successful export department and a successful factory representative require Ballance, Ballast and



THE above chart gives a graphic comparison of the imports of motor vehicles to Australia from the United States, Canada, Great Britain and Europe. The United States and Canada together account for 85% of the imports, the other 15% being divided between the United Kingdom and Europe.

However, there is another side to the story, which is told by the shaded portions of the bars. Looking at these it is seen that during the period of January-June this year there was an increase of only 11 per cent in imports from the United States over the figures for the corresponding period of 1924. There was an actual decrease of 16 per cent for Canada. But imports from the United Kingdom jumped 139 per cent, and Europe increased its shipments 16 per cent.

Brains. Balance to be able to select the correct distributor for his product and to be able to know how to act in such a way socially and in business so that the respect and confidence of the Australian will be obtained and maintained. Ballast so that the decision when once made may be adhered to for a sufficient period of time to give the distributor the opportunity to prove himself. The custom of quick changes of distributors and of sudden changes in policy do not set well with the Australian people. Ballast to be able to face the peculiarities of a strange people without being critically predjudiced, or annoyed. Brains to be able to interpret the type of cooperation that the Australians want, to be able to know what they mean and supply their requirements adequately."

The Australian makes a firm friend but a very critical enemy. Once a man or a company or an automobile gets in wrong or does something "crooked," no power on earth can win back the confidence of their clients. The news is passed around from mouth to mouth and is accepted without question because the Australians have a custom of trusting each other to tell the truth. This silent propaganda is a most important factor in Australian business.

Selling Parts and Accessories

With special reference to the merchandising of smaller lines such as parts and accessories, there are quite a number of suggestions to be made. Special steps should be taken to protect American patent rights. Several cases have occurred where American parts and accessories were being openly manufactured in Australia.

Quite a number of factories, either directly or indirectly through a combination export manager in New York, deluge the Australian market with a direct mail campaign to automobile distributors, jobbers, garages, service stations, repair shops, etc. This practically amounts to "hawking" their lines around with the off chance of somebody taking them on. This form of sales propaganda has a very marked psychological effect on the Australian trade which immediately is prejudiced against the merits of any line that has to be "hawked" around in the above manner. Again, the customs department often steps in and puts a duty on the advertising literature that is being disposed of in this way. This means either that the Australian is "dunned" for the cost of the literature or the literature is returned to the sender. It is impossible to "run with the fox and hunt with the hounds," as the Australians say. In other words, the manufacturer must either deal with the legitimate jobbing trade or do his own jobbing and sell to the retailers.

The best way for parts and accessory manufacturers to obtain sales distribution in Australia is by appointment of Australian-born sales representatives who should be selected as a result of a careful examination of their recommendations and a precise checking up of their record. Unless this is done, many inefficient sales representatives are appointed, as happens to be the case on some lines today in Australia.

Once appointed, sales representatives should be given keen, continued and constructive cooperation on the part of the factory. The skimpy and sketchy handling of sales representatives and distributors will soon destroy the manufacturer's market. The sales representative should be a trusted servant of his company. His recommendations should be accepted. There should be no delay in making the adjustments that he requests. The sales representative should not be encouraged to "play" discounts. An instance is known where a line of valves was offered to Australian jobbers at trade discounts ranging from 40 to 70 per cent.

An indiscriminate mail campaign does not help the sales representative at all, but rather detracts from his chances of success because of the inferences drawn by the Australian jobber that the line is being "hawked around." The sales representative worth his salt will, upon taking up a new line, make a survey of his territory and select the man whom he wants to act as the distributor of the particular line under consideration, and he will then go out and get that man or the next best one.

Competition from European parts and accessory manufacturers is increasing, particularly in storage batteries, piston rings, lamps, clocks, brake linings, etc. It is very important that both American automobile and accessory manufacturers clarify their sales policies and stiffen up their sales organizations in Australia and New Zealand to meet the very real competition that is coming from European automobile and accessory manufacturers. Decentralization is very necessary. There seems to be too much of a tendency to crowd the New York or factory office with all the export talent of the organization, whereas the brunt of the fighting is to be found in the front line right out in the foreign field. This means that at least 80 per cent of the export talent and trained personnel of any automobile company should be situated right on the spot in export territories.

The volume of export business enjoyed by parts and accessory manufacturers will not be sufficient to justify the expense of salaried factory representatives nor will it sustain the heavy traveling expenses incurred thereby. The recommendation offered to parts and accessory manufacturing companies is to get hold of a good and reliable sales representative who is a native of the territory in which he operates, and employ him on a retainer and commission basis. It is much more important to do this than to have an export department in New York.

Method Has Proved Successful

The same recommendation is also offered in part to automobile manufacturers who maintain their own export offices abroad. A percentage of their personnel should be men brought in from foreign territories, trained and sent out as factory representatives. This is a procedure which has been found very successful in all branches of the Westinghouse industries, which have an export experience extending over a period of sixty years.

Another outstanding advantage of the resident sales representative is that the establishment of service in connection with the various lines that he is merchandising is rendered possible. To sell a jobber or a distributor a stock of batteries, ignition parts, shock absorbers, carburetors, magnetos, horns, etc., is not sufficient. Continuous and steady repeat orders can only be ensured by advising the jobber or distributor as to the correct methods of servicing his lines.

To sum up, Australian automotive trade conditions more closely parallel American conditions than any other export territory, and in addition, Australia today presents a larger potential development. Therefore, American manufacturers should realize that this market is worth at least the same kind of helpful cooperative treatment and vigorous constructive thought that is given so freely to domestic distributors.

WE have received a copy of the third edition of Farm Motors, by Andrey A. Potter, Dean of the Engineering Schools of Purdue University, which is published by the McGraw-Hill Book Co., Inc., New York. This is an elementary treatise designed for use as a text book in agricultural engineering and also as an aid to the farmer in familiarizing himself with the principles of the various types of power machinery used on the modern farm.

Gas-Electric Drive Discussed at Cleveland Section Meeting of S. A. E.

New development of electric control unit is described by E. M. Fraser. Operating data given in paper by J. C. Thirwall.

By Leslie S. Gillette

THE fundamentals and operation of the gas-electric drive principle formed the subject of the Cleveland Section meeting of the S. A. E., held December 14. E. M. Fraser, of the Fraser Electric Transmission Corp., Yonkers, N. Y., delivered a paper on "The Fundamentals of Gas-Electric Drive." After dealing with the theory of the electric drive, Mr. Fraser, who has done much development work in adapting the drive to passenger cars, buses and trucks, referred to a new electric control unit assembly of his own invention.

The unit, which combines the electric motor and generator in a single housing, is claimed to be more efficient and lighter than the usual method of gas-electric drive, and has been used with considerable success in a Cadillac 61 touring car in place of the conventional clutch and gearset. Complete working drawings of the mechanism as well as the motor unit rotor were exhibited and proved to be the center of much interest.

The unit consists briefly of an outside stationary case inside of which is a specially developed rotor acting in the capacity of a generator and driven from the gasoline engine. Inside of this rotor is another rotating element which in turn functions as a motor and drives the rear wheels. Finally a stationary field is located in the center of the entire unit. The rotors are of comparatively light weight and are made up on a false core, the bodies being formed of triple covered wire impregnated with a special insulating composition. Instead of the conventional type of commutator, one of the disk type is employed and is mounted in the vertical plane. One of the advantages of this arrangement is that the commutator does not get out of round and is self-cleaning. The virtue of this entire control device lies in its light and cheap construction, it being possible to use aluminum alloy extensively.

Three Methods of Control

In discussing the principles of the gas-electric drive, Mr. Fraser mentioned three ways of controlling the units: (1) Varying strength of the magnetic field; (2) varying voltage to motor and (3) shifting commutator brushes on motor. Methods 1 and 2 are the most in use, the third type not being so suitable on account of excessive sparking at the brushes. The main objection to the gas-electric principle, Mr. Fraser says, is the heavy weight and the high cost of the special units.

Mr. Fraser stressed the importance of not making direct comparisons between the gas-electric and gear drives but to base comparisons on overall efficiency. Frictional losses are considerably less with the electric drive and less hp. is required to perform a given amount of work. Tests conducted between the two types of vehicles at a speed of 30 m. p. h. indicated that the electric drive required two less hp. to overcome frictional effects. The gas-electric is said to coast more freely and has better braking efficiency. Figures taken from the gas-electrics in operation by the Fifth Avenue Coach Co., N. Y., showed a considerable saving in brake lining expenses alone.

The second paper of the evening was read by J. C. Thirwall, engineer, Railway Division of the General Electric Co., who discussed the results obtained with gas-electrics in actual road service, referring in the main to the two hundred gas-electric buses in operation for the past six months by the Philadelphia Rural Transit Co.

In his opinion the clutch and transmission is the weakest link in the chain of the conventional form of drive. Particularly where slippery conditions are met such as on icy streets, he favors the type of drive where two motors have a separate drive to the rear wheels thus eliminating the differential.

Motors in Tandem Favored

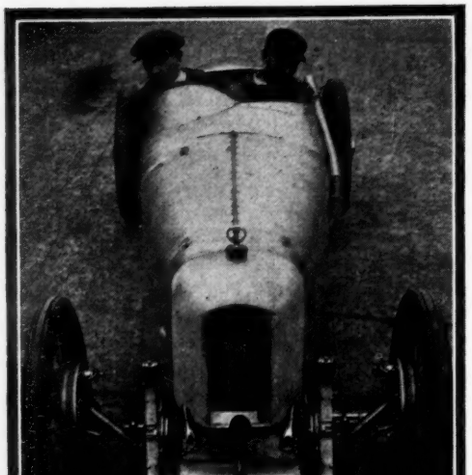
C. A. Atwell, of the Westinghouse Electric and Manufacturing Co., said the gas-electric's points of advantage are decreased cost of maintenance, smooth and rapid operation and easier control for the driver, enabling faster schedules to be maintained. In his opinion, two motors in tandem were more suitable than two motors each connected separately to the rear axle, as the latter style necessitates heavier construction.

A question as to the practability of the gas-electric drive principle for gasoline rail cars brought the answer from Mr. Thirwall that the General Electric Co. had supplied over 60 complete sets of electrical equipment for installation in rail cars and that their use had been found entirely satisfactory. The Brill company also has made several cars of this type, using different equipment, he said.

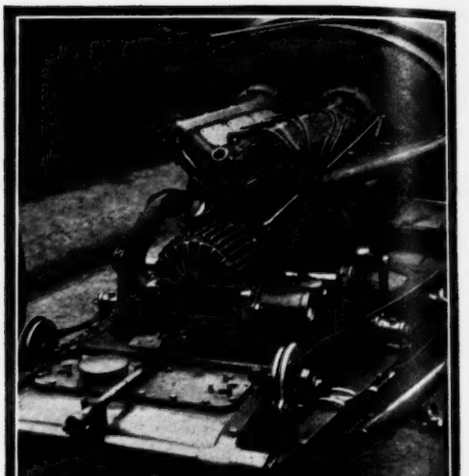
It may be argued on account of the electrical equipment that in addition to the regular maintenance force of mechanics, skilled electricians would be necessary to care for the motor, generator and controller. It is claimed that with so few moving parts and the simple nature of the entire installation, the electric drive rarely requires attention or overhauling.

The five major advantages of the gas-electric drive as emphasized by the speakers are:

1. Economy of upkeep (longer life for body, tires and chassis; decreased fuel and oil consumption).
2. Higher performance (ability to maintain faster schedules; quicker and steadier rate of acceleration).
3. Engine efficiency (engine runs at most economical speed; steady application of torque).
4. Increased safety (driver has both hands on wheel at all times; passenger falls reduced through elimination of jolts).
5. Smoother operation (increased comfort for passengers; less noise through elimination of gears).



Sixty-seven cu. in. Amilcar equipped with Rootes blower which has attained a speed of 118 m.p.h. on an European track



Amilcar engine showing Solex carbureter bolted direct to Rootes blower

67 cu. in. French Amilcar Built for Racing Develops 83 hp.; Weighs 925 lb.

Engine has six cylinders. Rootes double eight blower is driven from crankcase through elastic couplings. Models at N. Y. Salon.

A FRENCH Amilcar is said to be the first racing job to be built in anticipation of further decrease of piston displacement from the present American and European standard of 91½ cu. in. to 67 cu. in. or 1100 c.c. With six cylinders 55 by 77 mm. (2.16 by 3.03 in.) the racing Amilcars turn over at 6000 r.p.m. and are said to develop 83 hp. with a total weight—without fuel—of 925 lb.

The cylinders and upper half of the crankcase are a single iron casting. Two overhead camshafts driven by a train of spur pinions at the rear end of the crank shaft operate two valves per cylinder. The crankshaft and the connecting rods are carried on roller bearings, and four ball bearings are used for the camshafts. The aluminum sump contains a double oil pump, one furnishing oil to the main and connecting rod bearings and the other pumps oil from the base chamber to the main oil tank built between the front horns of the frame members.

A Rootes double eight blower is driven from the crankshaft through an elastic coupling. The Solex carbureter is bolted direct to the blower housing on the left side and the mixture is delivered to the cylinders through a perfectly straight manifold on the right hand side of the engine.

Engine Mounted by Tube

The engine is mounted to the frame by means of a tube passing through the front of the cylinder block and having its ends carried in rubber lined trunnions on the top of the frame members. The rear crankcase hangers are mounted on two studs, with coil springs interposed, on a central transverse frame member. The line of the crankshaft is above the top of the chassis frame as are also the drive shaft and the rear axle.

Clutch housing and gear box form a separate aluminum casting bolted to the engine. A fabric universal joint is used on the forward end of the driveshaft which is carried in a torque tube. A standard front axle with mechanically operated brakes is used. The brake mechanism goes through the steering pivot and front wheel brakes operate in conjunction with those on the rear wheels. Spiral bevel rear axle without differential is used.

Front springs are semi-elliptic and rear are quarter elliptic. Wheelbase is 87 in. and tread 40 in. Models of these cars, both with and without superchargers and equipped with fenders and other items for general driving were displayed at the recent Salon in New York. Cars of this type with superchargers were guaranteed to have a speed of 100 m.p.h. and 75 m.p.h when not equipped with blowers.

EXTENSIVE tests have been made in England with a view to determining the possibility of eliminating objectionable headlight glare by the use of colored or tinted bulbs. The bulbs were tested out in actual service on the buses of the Aldershot and District Traction Co., Ltd., and a report on the results was made in a recent paper by E. S. Shrapnell-Smith. It was found that yellow and cobalt blue gave the best results in eliminating the offending rays. Clear yellow or blue lamps only eliminated dazzle attributable to light radiated from a white-hot filament. After exhaustive tests, yellow showed itself to be in many respects superior to blue, and excellent results were obtained from a treated bulb termed the Osram half-sprayed yellow anti-dazzle lamp. Mr. Smith said that the substitution of tinted and treated translucent bulbs for the colorless transparent type would go a long ways toward solving the problem.